

Mississippi River Nine-Foot Channel Project  
Lock and Dam Number 9  
Lynxville, Wisconsin, vicinity  
Crawford County, Wisconsin  
Allamakee County, Iowa

HAER No. WI-50

HAER  
WIS,  
12-LYNX.V,  
1-

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## PHOTOGRAPHS HISTORICAL AND DESCRIPTIVE DATA

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Historic American Engineering Record  
Department of the Interior  
National Park Service  
Rocky Mountain Regional Office  
P.O. Box 25287  
Denver Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

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Mississippi River Nine-Foot Channel Project, Lock and Dam Number 9

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Location: 3.2 miles below Lynxville, Wisconsin, and 205.1 miles below Minneapolis, Minnesota, in Crawford County, Wisconsin, and Allamakee County, Iowa

Lock and Dam Complex Site--General Setting and Orientation: The river at the time of construction was approximately 1,100 feet wide at normal level, spreading to approximately 10,000 feet in flood stages.

Date of Construction: 1936-1940

Present Owner: United States Government  
U. S. Army Corps of Engineers  
St. Paul District  
St. Paul, Minnesota

Present Use: River navigation/hydrology control

Significance: The Mississippi River Lock and Dam Project represents one of the largest and most ambitious of such undertakings. With roots in the Progressive Era, the project was adopted by New Deal proponents to serve the needs of public employment during the Great Depression. Its successful completion turned the upper reaches of one of the world's largest rivers into a intra-continental canal and settled the question of a fully navigable interior river system through the Midwest. Completion of the system helped allay economic inequities in commercial rail and water freight rates brought about as a result of the opening of the Panama Canal. Although significantly altering the environment of the upper Mississippi River, the project also served as an impetus for the upgrading of municipal drinking water and sewage disposal systems, as well as providing new recreational opportunities, thus, in the end, proving generally beneficial to public welfare.

Historian: William Patrick O'Brien  
October 1987

(See HAER No. MN-20 for complete history, footnotes and bibliography)

## PART I. HISTORICAL INFORMATION

### A. Physical History

1. Dates of Erection: 1936-1940
2. Architect/Engineer: U. S. Army Corps of Engineers
3. Original and Subsequent Owners: United States Government
4. Builders, Contractors, Suppliers:

#### Lock Construction

a. General contractors: Walter W. Magee Co., St. Paul, Minnesota

b. Subcontractors:

Dubuque Boat and Boiler Co., Dubuque, Iowa (driving cofferdam)  
Central Pile and Foundation Co., Chicago, Illinois (driving  
foundation piling)  
McClintic-Marshall Corp., Chicago, Illinois (structural  
steel)  
W. J. Durnford, Bloomington, Wisconsin (protection stone)  
H. E. Pederson, LaCrosse, Wisconsin (placing reinforcing steel)

#### Dam Construction

a. General contractor: United Construction Co., Winona, Minnesota

b. Subcontractors:

R. C. Mahon Company  
Fred J. Rogers  
J. J. Harker  
LaCrosse Dredging Company  
E. C. Schroeder  
Ashworth-Hawkinan Company (locations unavailable)

5. Original Plans and Construction: U. S. Army Corps of Engineers

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6. Alterations and Additions:

<u>Item</u>	<u>Year</u>
Construct embankment gravel blanket and riprap bank protection; soil cement road surface with bituminous seal coat; raise existing right-of-way fence and gate	1939
Repaint five Roller and eight Tainter gates	1940
Straighten second vertical beam from guoin girder and two diagonals; replace seven damaged horizontal wood fenders near guoin end of gate	1942
Install automatic railroad grade crossing signals	1949
Install rock for scour protection adjacent to dam structure, upstream portion of abutment pier, and Roller gate section	1952
Repair damage inflicted by towboat to downstream side of landward Miter gate leaf	1953
Install cathodic protection system on auxiliary lock gate	1956
Repaint all accessible structural steel surfaces above water surface	1956
Recondition main lock upper and lower gates	1957
Cathodic protection repairs and replacement	1961
Repaint five Roller and eight Tainter gates	1962
Repair access road	1962
Central control station reroofing	1967
Replace sector control and bevel gear bushings, etc.	1968
Seal coat access roads	1968
Construct stabilized aggregate surface course on earth-filled dike	1969
Construct slough aeration culvert	1970
Construct riprap scour protection	1970
Public restroom construction	1975
Repair upper guide wall	1979
Spillway cell repaired	1980
Repair 15 spillway cells	1982
Construct scour protection downstream of dam	1982
Repair lockwall concrete surfaces	1983
Construct loading docks	1984
Scour protection at lock and upstream and downstream of dam	1984

B. HISTORICAL CONTEXT:

Due to a good six-foot channel and relatively untroublesome engineering and environmental characteristics, Lock and Dam Number 9 was a group "B" priority project and the second-to-last complex completed in the Nine-Foot Channel Project. The project was the last to be officially accepted as complete.

The main lock is of standard dimensions, 110 by 600 feet, with a planned auxiliary lock with dimensions of 110 by 360 feet. The movable dam system is 811 feet in length and consists of five 3-foot submersible Roller gates, 80 by 20 feet, two submersible Tainter gates, and six non-submersible Tainter gates. All Tainter gate units are 35 by 15 feet. The submersible Tainter gate units are located adjacent to the abutment pier. An earth dike extends from the far Tainter gate abutment northwest for 8,004 feet and is intersected by a submersible dam 1,350 feet long.

Lock lift is 9 feet. Upper normal pool elevation is 620 feet. Depth on upper Miter sill is 16 feet; lower Miter sill is 13 feet. Foundation materials for lock and dam elements consist of piles in sand.

The lock element was completed April 24, 1935; the dam elements were completed May 13, 1938. Esplanade, garage/pumphouse, and lockkeepers' dwellings were also part of the project scope. The complex took six years to complete (1934-1940) at an estimated cost of \$8,287,000. It was opened to navigation in 1938.

Lock construction and dam design and construction were supervised by the St. Paul District Office of the U. S. Corps of Engineers and Major Dwight Johns. Colonel Fleming took over supervision of the projects upon his appointment as engineer for the St. Paul District on July 23, 1937.

PART II. TECHNOLOGICAL INFORMATION

A. General Statement:

1. Architectural character: standardized Ohio-Mississippi lock design.
2. Condition of fabric: good.

B. Description of General Layout and Principal Elements:

1. Overall dimensions: 110 by 600 feet.
2. Foundations: wood and steel sheet pilings in sand, gravel, and broken rock.

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3. Walls: reinforced monolithic concrete.
4. Structural system: see above.
5. Bulkheads: concrete bulkhead configurations occur at each end of the riverward lock wall.
6. Upper and lower guide walls: monolithic reinforced concrete walls extending out from the lock chamber at either end to assist in the guiding of barge traffic into the lock.
7. Stage recorder: small concrete housing located at the end of the lock guide wall. Equipment housed for the recording of river stages.

C. Mechanical Equipment:

1. Operating house: controls for lock gates and Tainter valves housed in small buildings on lock wall.
2. Tainter valves: cable drive lock valve of steel construction with electric motorized assembly.
3. Gates: two Miter gates balanced on stainless steel pintels operated by gear arm system and electric motor assemblies. Bumper lines on interior of lock also of stainless steel. All other associated metal parts are of steel, stainless steel, or steel/nickel alloy.
4. Lighting: various freestanding single and double head lighting standards, ca. 1935.
5. Plumbing: lock is watered by four cable drive Tainter valves serving a system of cast-in-place tunnels that enable the water level to be controlled on the interior of the lock.

D. Other Elements:

1. Auxiliary lock: fixed Miter gate without machinery and partial walls located to the riverward side of the lock complex. Equipped with wells for machinery placement. Never completed or put into service.

PART III. TECHNOLOGICAL INFORMATION--MOVABLE DAM

A. General Statement:

1. Architectural character: type 2a Roller gate piers have large beveled corners and are elephantine in nature.

2. Condition of Fabric: excellent.

B. Description of Exterior:

1. Overall dimensions: 811 feet in length.
2. Foundations: wood and steel sheet pilings in sand.
3. Operating house walls: monolithic reinforced concrete.
4. Structural system: monolithic concrete/structural steel.
5. Bulkheads: concrete bulkheads located at the base of each Roller gate pier.
6. Operating house openings: two doorways and 13 three-pane slit windows for each Roller gate operating house.
  - a. Doorways and doors: 12.
  - b. Windows: 78.
7. Operating house roofs:
  - a. Shape, covering: flat roof covered in membrane/tar composition.
  - b. Towers, piers: five Roller gate piers and operating house towers; one access tower.
8. Access bridges:
  - a. Shape: arched spans in a segmental series.
  - b. Materials: structural steel.

C. Description of General Layout and Principal Elements:

1. Access plans: plan of access consists of a simple stairway to the initial pier operating house, each installation being connected by an access bridge/rail track in a linear series.
2. Stairways: reinforced concrete with pipe railing.
3. Flooring: reinforced concrete.
4. Wall and ceiling finish: reinforced concrete.
5. Hardware: brass.

D. Mechanical Equipment:

1. Movable gate--Roller type: five 5-foot submersible Roller gates, 80 by 20 feet, operating on tooth track and independent chain-driven hoist machinery.
2. Movable gates--Tainter type: two 2-foot submersible and six non-submersible Tainter gates having independent chain-driven hoist machinery.
3. Lighting: fixtures as of time of installation ca. 1935. Rewiring may have taken place over the years--extent is unknown.

E. Other Elements:

1. Earth dikes: a linear non-submersible dike with riprap revetment runs northwest of the movable dam section toward the Iowa side, incorporating various small islands as part of its configuration. The earth dike is interrupted by a submersible dam 1,350 feet in length.
2. Roller gate bulkheads: temporary blocking units of structural steel girder construction placed in gate openings in period of emergency or repair.
3. Bulkhead car/tracks: car designed to store and access bulkheads. Located in storage yard.
4. Flatcar assembly: car for the transport of gate bulkheads and repair materials.
5. Movable crane: Vertical lift crane (replaced ca. 1980) used for the moving of parts and equipment. Operates on track system attached to girder spans. Original "C" type unit. Drawings of replacement unit available from St. Paul District Office.
6. Storage yard: area surrounding the last Tainter gate pier on the Minnesota side. Contains replacement part for gates, bulkheads on track cars, and related repair items.
7. Boat launch: single-armed launch of metal construction. Installed ca. 1985.



#### **PART IV. TECHNOLOGICAL INFORMATION--ESPLANADE AREA**

##### **A. Description of Esplanade--General Layout:**

1. Design character: standardized park/service area component. The esplanade area was originally designed to accommodate the central control station, lockkeeper's and assistant lockkeeper's residences, parking, and other service-related functions.
2. Historic landscape design: based on standardized designs. See drawings for esplanade and lockkeeper's residences.

##### **B. Condition of Site and Structures: Altered.**

1. Central control station--exterior: standardized construction. Hip roof; concrete stucco finish.
  - a. First floor contains central control panel and room, bathroom, main office, and basement stairway access.
  - b. Basement contains storage and equipment rooms. All interior finishes altered from original construction.
2. Lockkeeper's/assistant lockkeeper's residences: standardized Colonial Revival with side porch. The structures have been moved off site to locations off Highway 35, north and south of Lynxville, Wisconsin.
3. Outbuildings: various sheds and service buildings have been erected from time to time, as demands required--none have particular significance or contribute to the site. A new brick garage structure was constructed ca. 1985. The original garage servicing the lockkeeper's and assistant lockkeeper's residences still stands.

#### **PART V. SOURCES OF INFORMATION**

- A. Original Architectural Drawings: St. Paul District Office, Construction Drawings--9-Foot Channel Project 1927-1984. Passim.
- B. Early Views: Construction Photographs: Lock and Dam 9--Photograph Log Books.
- C. Interviews: Personnel, Lock and Dam 9.

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D. Bibliography

1. Primary and unpublished sources: National Archives, Record Group 77; Construction Histories--Lock and Dam 9; see mn-20, bibliography.
2. Secondary and published sources: see MN-20, bibliography.

E. Likely Sources Not Yet Investigated: National Archives, Record Group 77, Suitland, Maryland; St. Louis, Missouri.

F. Supplemental Material: Aerial Photographs, U. S. Army Corps of Engineers, St. Paul District.

### LOCKS AND DAMS 3 THROUGH 10--INDIVIDUAL SIGNIFICANCE AND INVENTORIES

The following outlines document specific significant technologies reflected in the construction of the individual lock and dam complexes, calling attention to unique engineering design items. Changes made to various systems since their initial completion are also a part of this section. A number of maintenance changes have occurred at various times since their completion. Changes made before 1970 are not well documented; many were superficial. Complete documentation to system changes is contained in the monthly condition reports filed with the St. Paul District Office by the various installations. Some changes may have been made over the years without benefit of documentation. Therefore, the following tables should not be interpreted as entirely inclusive.

It should be noted that architectural and engineering components vary significantly from site to site. Architectural styles for gate pier design fall into two categories: those completed prior to 1935-1936 (1a, 1b) and those completed after those dates (2a, 2b). Only one 1a structure exists in the entire 9-Foot Channel system and is located at Rock Island, Illinois; as such it is not a part of this study. The 1b structures are characterized by large, multipane windows, hip roofs, and engaged buttress detailing on the gate house piers. The 2a structures are more streamlined in style with slit, three-pane windows, flat roofs, and no buttress detail. The 2b structures are identical to 2a elements except for addition of a metal panel in the Roller gate track section of the gate piers that does not occur in 2a structures. Only 1b and 2a architectural types occur in the St. Paul District. Other elements such as central control stations, lockkeepers' residences, and associated structures are standardized unless otherwise noted.

Dates for the construction of each complex are given from the beginning of initial work to the end of the project and do not necessarily reflect the construction dates of any single element. Complete construction histories for each complex containing exhaustive documentation for the building of the lock, dam, esplanade features, and other attendant installations are on file with the St. Paul District Office. These histories contain comprehensive listings for all general contractors and subcontractors involved in the project as well as a listing for all material suppliers. For the purposes of this study, information regarding contractors and subcontractors has been reproduced as it appears in the construction histories; as a result certain inconsistencies appear as a matter of course. For example, in some histories the contractor's business location is cited by city; in others this information is not included. In addition, approximately 10,000 separate construction drawings and illustrations were produced during the project and during the course of maintenance since its completion. Drawings were selected from among these materials to illustrate both standardized elements as well as those pertaining to specific sites. Drawing numbers are noted at the end of entries where applicable; "()" indicates standardized elements illustrated elsewhere in the system; "\*" indicates elements for which drawings are not readily available. General index sheets have also been reproduced at the beginning of each lock and dam illustration collection for a complete reference. Contemporary photographic documentation including 16mm film footage served to document the project. Photographs are on file in the St. Paul District Office and at each individual installation. Sixteen millimeter film footage is available in video cassette format from the St. Paul Office.

Dimensions for the movable gate sections are given in approximate figures based on the general notations as found in official Corps publications. For example, Roller gates are generally cited as being standardized as either 60 by 20 feet or 80 by 20 feet; however, in the construction history notations, gate lengths are often given exactly as 88 feet 10 1/2 inches long and 15 feet in diameter. Similar approximations apply to information concerning Tainter gate elements. Measurements in both instances should be taken only as approximations for use in categorizing the various sizes and styles of installations and not as an exact measure per se.